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## BOOKS AND PERIODICALS.

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*Mathematics for Common Schools.* A Graded Course in Arithmetic, with Simple problems in Algebra and Geometry, by John H. Welsh, Associate Superintendent of Public Instruction, Brooklyn, New York. 8vo, 800 pp. Boston: D. C. Heath & Co.

This work is issued in three parts, bound separately or together.

Part I. An Elementary Arithmetic for the upper primary grades, includes simple work in denominate numbers, common and decimal fractions, and measurements.

Part II. An Intermediate Arithmetic, for lower grammar grades, reviews the work of the Elementary Arithmetic, and takes up the easier (and more important) parts of percentage and interest. A chapter on easy equations of one unknown quantity, which may be commenced at any time throughout the course, is appended.

Part III. A Higher Arithmetic, for the upper grammar grades, extends the work in percentage and interest, with the various applications, using the algebraic methods for the solution of the so-called "problems."

A very commendable feature of this work is the introduction of the simple algebraic methods, thus making the pupil familiar with many of the algebraic operations before he takes it up as a distinct subject.

Throughout the three parts are developed the ordinary applications of geometry to finding the areas, surfaces, and volumes of geometrical magnitudes.

The books are handsomely bound in cloth and leather, and the typography is first class. For terms for introduction write the publishers, who will be glad to answer any inquiries respecting this work.

B. F. F.

*The Non-Euclidean Geometry.* Geometrical Researches on the Theory of Parallels, by Nicholas Lobatschewsky. Translated from the original by George Bruce Halsted, A.M., Ph. D., ex-Fellow of Princeton College and Johns Hopkins University, Professor of Mathematics in the University of Texas, Austin, Texas. [Fourth Edition, 1892.] Price, bound and post paid, \$100.

No one should consider a teacher of geometry who has not read and studied the difficulties attending the development of a consistent theory on parallels. The theory here presented is logical, consistent and mathematical.

What the result of further study and investigation in Non-Euclidean geometry will be no one may say: but that it will be far reaching and have great bearing upon subsequent scientific development can not be doubted.

Great credit is due Dr. Halsted for his lucid translation of this important theory.

B. F. F.

*On the Definitions of the Trigonometric Functions.* By Alexander Macfarlane, M. A., D. Sc., LL. D., Professor of Physics in the University of Texas.

This valuable paper by Professor Macfarlane was read before the Mathematical Congress at Chicago, August 22, 1893, and is one of the series of able papers he has written on Space Analysis. In the present paper, the author first reviews critically the historical definitions of the trigonometric terms, and the definitions, triangular, circular, or hyperbolic, given in the best modern treatises, and then proceeds to devise a logical system of definitions which will apply to space-analysis and that modern trigonometry, which includes the properties both of circular and hyperbolic functions, and will bring within the same domain the properties of the elliptic, general hyperbolic,

and other functions. In the above pamphlet attention is mostly given to trigonometry in a plane, trigonometry in space being reserved for a separate paper. Copies of this instructive pamphlet (50 pages) can be had of the author, University of Texas. Price, 50 cents. J. M. C.

*Academic Geometry.* By William F. Bradbury, A. M., Head Master of the Cambridge Latin School, 1893. 8 vo, 384pp. Price \$1.25. Boston: Thompson, Brown, and Company.

This book in the "Bradbury's Eaton's Mathematical Series" has many good features. The definitions are clear and accurate, and in the demonstrations the successive logical steps are concisely stated. The exercises for original demonstration, are numerous and so arranged as to be progressive in order of difficulty. Many practical problems are given throughout the book. The author introduces the terms "Normal to a Plane," and "Aspect of a Plane" and thus extends to planes the same idea that is used in the definition and treatment of lines and angles in the first book. J. M. C.

*Public School Algebra* on the inductive method. By C. Clarkson, B. A., Principal of Seaport Collegiate Institute and formerly Principal of the Provincial Model School, Toronto. 188p. Toronto: The W. J. Gage Co.

This book is intended as an Introductory Series of Development Lessons to form a guide to oral teaching and a thorough introduction to larger works. The guiding principles of the book are to follow the line of least resistance, to seek practical applications from the commencement, and to postpone all matters that are abstruse to a second and more advanced course. As an aid to oral teaching the book will prove very helpful.

*Two papers:* (1) *A Chapter on the Digits*; (2) *A Chapter on the Property of Numbers—Curios in Mathematics*, by S. C. Gould. Reprinted from *Notes and Queries*, 1892.

The nine digits are susceptible of many singular and peculiar evolutions, some of which are brought together in this paper as a sort of digest. Many of the peculiar properties of numbers are also here collected and accredited to their discoverers as far as known. The pamphlet contains 32 pages and is brimful of the curious in mathematics. J. M. C.

*The Mathematical Magazine*; A Journal of Elementary and Higher Mathematics. Edited and Published by Artemas Martin, M. A., Ph. D., LL.D., Washington, D. C. Issued Quarterly. Price, \$1.00 per year.

We have just received advanced sheets of the October Number, 1893, of this valuable journal, and are delighted with its contents. On pages 129--134 is a solution to the "Four-Pennies Problem" by our valued contributor, Professor Henry Heaton, M. S., Atlantic, Iowa. The integration in the solution was not performed as the practical importance of the solution would not warrant the great amount of labor necessary to perform the integration.

The partial solution is masterly and is illustrated by five beautiful diagrams.

On page 135 is a new and Expeditious Method of Computing the Square Root, by Charles H. Kummel. Other papers are as follows:

On Rational Triangles, by C. A. Roberts and About Square Numbers Whose Sum Is A Square Number—III., by Dr. Artemas Martin. Five solutions to problem 121 are published, it being the only problem solved. Ten very interesting problems are proposed for solution. We hope that the October Number, 1893, of this very excellent Journal may find many anxious readers. B. F. F.

*The Educational Times*, London, England, for March contains, besides the usual amount of valuable matter, the solution of 14 excellent problems and 36 new problems proposed. One is sure to find in each issue of this periodical many elegant solutions to difficult problems.

*Bibliography on the Polemic Problem: What is the Value of  $\pi$ .* Compiled by S. C. Gould, Editor of "Notes and Queries," 1888, Manchester, N. H.

The compiler states that of the 100 titles given in this bibliography, 52 are bound volumes, 32 are pamphlets, 7 are broadsides, and the remaining are communications to the press. The results of 63 of these writers are given, tabulated and classified, for comparison. This Bibliography of Cyclometry and Quadratures gives more than thirty publications by American writers who believe they have found the true and exact ratio. The above is a neat pamphlet of 32 pages, and gives a brief review of most of the works mentioned therein.

J. M. C.

*The School Visitor*, Devoted to Practical Mathematics, Examination Work, Notes, Queries, and Answers. Edited and Published by John S. Royer, Superintendent of Schools, Versailles, Ohio. Published monthly. Price, \$1.00 per year.

This progressive journal is just what teachers and students want. In the Feb. No. are published the solutions to six problems and the solution to a special problem. Seventeen problems are proposed for solution. Nine pages are devoted to practical examination work, five pages to answers to Queries, and one page to new Queries.

B. F. F.

